



## RAW SEQUENCE LISTING ERROR REPORT

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) detected errors when processing the following computer readable form:

Application Serial Number: 10/501,127  
Source: PCT  
Date Processed by STIC: 9/24/04

THE ATTACHED PRINTOUT EXPLAINS DETECTED ERRORS.

PLEASE FORWARD THIS INFORMATION TO THE APPLICANT BY EITHER:

- 1) INCLUDING A COPY OF THIS PRINTOUT IN YOUR NEXT COMMUNICATION TO THE APPLICANT, WITH A NOTICE TO COMPLY or,
- 2) TELEPHONING APPLICANT AND FAXING A COPY OF THIS PRINTOUT, WITH A NOTICE TO COMPLY

FOR CRF SUBMISSION AND PATENTIN SOFTWARE QUESTIONS, PLEASE CONTACT MARK SPENCER, TELEPHONE: 571-272-2510; FAX: 571-273-0221

TO REDUCE ERRORED SEQUENCE LISTINGS, PLEASE USE THE CHECKER VERSION 4.2 PROGRAM, ACCESSIBLE THROUGH THE U.S. PATENT AND TRADEMARK OFFICE WEBSITE. SEE BELOW FOR ADDRESS:

<http://www.uspto.gov/web/offices/pac/checker/chkrnote.htm>

Applicants submitting genetic sequence information electronically on diskette or CD-Rom should be aware that there is a possibility that the disk/CD-Rom may have been affected by treatment given to all incoming mail.

Please consider using alternate methods of submission for the disk/CD-Rom or replacement disk/CD-Rom.

Any reply including a sequence listing in electronic form should NOT be sent to the 20231 zip code address for the United States Patent and Trademark Office, and instead should be sent via the following to the indicated addresses:

1. EFS-Bio (<<http://www.uspto.gov/ebc/efs/downloads/documents.htm>> , EFS Submission User Manual - ePAVE)
2. U.S. Postal Service: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
3. Hand Carry, Federal Express, United Parcel Service, or other delivery service (EFFECTIVE 06/05/04):  
U.S. Patent and Trademark Office, 220 20<sup>th</sup> Street S., Customer Window, Mail Stop Sequence, Crystal Plaza Two, Lobby, Room 1B03, Arlington, VA 22202

Revised 05/17/04

BEST AVAILABLE COPY

# Raw Sequence Listing Error Summary

## ERROR DETECTED

## SUGGESTED CORRECTION

SERIAL NUMBER: 10/501,127

ATTN: NEW RULES CASES: PLEASE DISREGARD ENGLISH "ALPHA" HEADERS, WHICH WERE INSERTED BY PTO SOFTWARE

- 1 Wrapped Nucleics  
The number/text at the end of each line "wrapped" down to the next line. This may occur if your file was retrieved in a word processor after creating it. Please adjust your right margin to .3; this will prevent "wrapping."
- 2 Invalid Line Length The rules require that a line not exceed 72 characters in length. This includes white spaces.
- 3 Misaligned Amino Numbering The numbering under each 5<sup>th</sup> amino acid is misaligned. Do not use tab codes between numbers; use space characters, instead.
- 4 Non-ASCII The submitted file was not saved in ASCII(DOS) text, as required by the Sequence Rules. Please ensure your subsequent submission is saved in ASCII text.
- 5 Variable Length Sequence(s)            contain n's or Xaa's representing more than one residue. Per Sequence Rules, each n or Xaa can only represent a single residue. Please present the maximum number of each residue having variable length and indicate in the <220>-<223> section that some may be missing
- 6 PatentIn 2.0 "bug" A "bug" in PatentIn version 2.0 has caused the <220>-<223> section to be missing from amino acid sequences(s)           . Normally, PatentIn would automatically generate this section from the previously coded nucleic acid sequence. Please manually copy the relevant <220>-<223> section to the subsequent amino acid sequence. This applies to the mandatory <220>-<223> sections for Artificial or Unknown sequences.
- 7 Skipped Sequences (OLD RULES) Sequence(s)            missing. If intentional, please insert the following lines for each skipped sequence:  
(2) INFORMATION FOR SEQ ID NO: X (insert SEQ ID NO where "X" is shown)  
(i) SEQUENCE CHARACTERISTICS (Do not insert any subheadings under this heading.)  
(xi) SEQUENCE DESCRIPTION SEQ ID NO: X (insert SEQ ID NO where "X" is shown)  
This sequence is intentionally skipped  
Please also adjust the "(ii) NUMBER OF SEQUENCES" response to include the skipped sequences
- 8 Skipped Sequences (NEW RULES) Sequence(s)            missing. If intentional, please insert the following lines for each skipped sequence:  
<210> sequence id number  
<400> sequence id number  
000
- 9 Use of n's or Xaa's (NEW RULES) Use of n's and/or Xaa's have been detected in the Sequence Listing  
Per 1.823 of Sequence Rules, use of <220>-<223> is MANDATORY if n's or Xaa's are present  
In <220> to <223> section, please explain location of n or Xaa, and which residue n or Xaa represents
- 10 Invalid <213> Response Per 1.823 of Sequence Rules, the only valid <213> responses are: Unknown, Artificial Sequence, or scientific name (Genus/species). <220>-<223> section is required when <213> response is Unknown or is Artificial Sequence
- 11 Use of <220> Sequence(s) 2,4,6,8,10,12,14,16,18,20,22 missing the <220> "Feature" and associated numeric identifiers. Use of <220> to <223> is MANDATORY if <213> "Organism" response is "Artificial Sequence" or "Unknown." Please explain source of genetic material in <220> to <223> section.  
(See "Federal Register," 06/01/1998, Vol. 63, No. 104, pp. 29631-32) (Sec. 1.823 of Sequence Rules)
- 12 PatentIn 2.0 "bug" Please do not use "Copy to Disk" function of PatentIn version 2.0. This causes a corrupted file, resulting in missing mandatory numeric identifiers and responses (as indicated on raw sequence listing). Instead, please use "File Manager" or any other manual means to copy file to floppy disk.
- 13 Misuse of n/Xaa "n" can only represent a single nucleotide; "Xaa" can only represent a single amino acid



PCT

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

3 <110> APPLICANT: ID-Lelystad, Instituut voor Dierhouderij en Diergezondheid B.V.  
 4 Willemsen, Petrus T.J.  
 5 Westerveen, Sjoukje F.  
 6 Bakker, Douwe  
 7 Zijderveld van, Fred G.  
 8 Thole, Jelle E.R.  
 10 <120> TITLE OF INVENTION: Paramycobacterial diagnostics and vaccines  
 12 <130> FILE REFERENCE: P54977PC00  
 C--> 14 <140> CURRENT APPLICATION NUMBER: US/10/501,127  
 C--> 15 <141> CURRENT FILING DATE: 2004-07-09  
 17 <150> PRIOR APPLICATION NUMBER: EP 02075089.9  
 18 <151> PRIOR FILING DATE: 2002-01-11  
 20 <160> NUMBER OF SEQ ID NOS: 22  
 22 <170> SOFTWARE: PatentIn Ver. 2.1

Does Not Comply  
 Corrected Diskette Needed

## ERRORED SEQUENCES

131 <210> SEQ ID NO: 2  
 132 <211> LENGTH: 336  
 133 <212> TYPE: PRT  
 134 <213> ORGANISM: Mycobacterium avium paratuberculosis  
 135 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:  
 136 immunogenic protein of M. avium paratuberculosis  
 138 <400> SEQUENCE: 2  
 139 Val Pro Asn Arg Arg Arg Arg Lys Leu Ser Thr Ala Met Ser Ala Val  
 140 1 5 10 15  
 141 Ala Ala Leu Ala Val Ala Ser Pro Cys Ala Tyr Phe Leu Val Tyr Glu  
 142 20 25 30  
 143 Ser Thr Ala Gly Asn Lys Ala Pro Glu His His Glu Phe Lys Gln Ala  
 144 35 40 45  
 145 Ala Val Met Ser Asp Leu Pro Gly Glu Leu Met Gly Ala Leu Ser Gln  
 146 50 55 60  
 147 Gly Leu Ser Gln Phe Gly Ile Asn Leu Pro Pro Val Pro Ala Leu Ser  
 148 65 70 75 80  
 149 Gly Gly Ala Thr Ser Thr Pro Gly Leu Ala Ser Pro Gly Leu Gly Ser  
 150 85 90 95  
 151 Pro Gly Leu Gly Thr Pro Gly Leu Gly Thr Pro Gly Leu Thr Asn Pro  
 152 100 105 110  
 153 Gly Leu Thr Ser Pro Gly Ala Thr Ser Pro Gly Leu Thr Ser Pro Gly  
 154 115 120 125  
 155 Leu Thr Ser Pro Gly Leu Thr Ser Pro Gly Leu Thr Ser Pro Gly Ala  
 156 130 135 140

(pg. 1-68)

←  
 P/S  
 insert  
 (2207, whenever  
 (2217, (2227  
 OR (2237  
 is present.  
 P/S see  
 item #11  
 on error  
 summary sheet.

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

```

157 Ala Pro Thr Thr Pro Gly Leu Thr Ala Pro Gly Ala Leu Pro Thr Thr
158 145 150 155 160
159 Pro Gly Gly Gly Val Ala Thr Pro Gly Ala Gly Leu Asn Pro Ala Leu
160 165 170 175
161 Ser Asn Pro Gly Leu Thr Ser Pro Ala Gly Thr Ala Pro Gly Leu Gly
162 180 185 190
163 Ser Pro Thr Val Ala Pro Ser Glu Val Pro Ile Asp Ser Gly Ala Gly
164 195 200 205
165 Leu Asp Pro Gly Ala Gly Gly Thr Tyr Pro Ile Leu Gly Asp Pro Ser
166 210 215 220
167 Thr Phe Gly Asn Ala Ser Pro Ile Gly Gly Gly Thr Gly Leu Gly
168 225 230 235 240
169 Gly Gly Ser Ser Ser Gly Gly Ser Gly Gly Leu Val Asn Asp Val Met
170 245 250 255
171 Gln Ala Ala Asn Gln Leu Gly Ala Gly Gln Ala Ile Asp Leu Leu Lys
172 260 265 270
173 Gly Leu Val Met Pro Ala Ile Thr Gln Gly Met His Gly Gly Ala Ala
174 275 280 285
175 Ala Gly Ala Leu Pro Gly Ala Ala Gly Ala Leu Pro Gly Ala Ala Gly
176 290 295 300
177 Ala Leu Pro Gly Ala Ala Gly Ala Leu Pro Gly Ala Ala Gly Ala Ala
178 305 310 315 320
179 Gly Ala Leu Pro Ala Ala Ala Gly Ala Ala Pro Ala Leu Pro Pro Val
180 325 330 335
247 <210> SEQ ID NO: 4
248 <211> LENGTH: 167
249 <212> TYPE: PRT
250 <213> ORGANISM: Mycobacterium avium paratuberculosis
251 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:
252 immunogenic protein of M. avium paratuberculosis
E--> 254 <400> SEQUENCE: 4
255 Met Ser Arg Leu Ser Phe Val Cys Arg Leu Leu Ala Ala Thr Ala Phe
256 1 5 10 15
258 Ala Val Ala Leu Leu Leu Gly Leu Gly Asp Val Pro Arg Ala Ala Ala
259 20 25 30
261 Thr Asp Asp Arg Leu Gln Phe Thr Ala Thr Thr Leu Ser Gly Ala Pro
262 35 40 45
264 Phe Asn Gly Ala Ser Leu Gln Gly Lys Pro Ala Val Leu Trp Phe Trp
265 50 55 60
267 Thr Pro Trp Cys Pro Tyr Cys Asn Ala Glu Ala Pro Gly Val Ser Arg
268 65 70 75 80
270 Val Ala Ala Ala Asn Pro Gly Val Thr Phe Val Gly Val Ala Ala His
271 85 90 95
273 Ser Glu Val Gly Ala Met Ala Asn Phe Val Ser Lys Tyr Asn Leu Asn
274 100 105 110
276 Phe Thr Thr Leu Asn Asp Ala Asp Gly Ala Ile Trp Ala Arg Tyr Gly
277 115 120 125
279 Val Pro Trp Gln Pro Ala Tyr Val Phe Tyr Arg Ala Asp Gly Ser Ser
280 130 135 140

```

PLS insert  
 <220>  
 Feature,  
 whenever  
 <221>, <222>  
 or <223>  
 is present.  
 PLS see  
 item #  
 11 on erron  
 summary  
 sheet.

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

282 Thr Phe Val Asn Asn Pro Thr Ser Ala Met Pro Gln Asp Glu Leu Ala  
 283 145 150 155 160  
 285 Ala Arg Val Ala Ala Leu Arg  
 286 165  
 337 <210> SEQ ID NO: 6  
 338 <211> LENGTH: 110  
 339 <212> TYPE: PRT  
 340 <213> ORGANISM: Mycobacterium avium paratuberculosis  
 341 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:  
 342 immunogenic protein of M. avium paratuberculosis  
 344 <400> SEQUENCE: 6  
 345 Met Arg Leu Ser Leu Ser Lys Leu Gly Val Ala Val Gly Ser Ala Ala  
 346 1 5 10 15  
 347 Val Ala Leu Thr Ala Ala Ala Gly Val Ala Ser Ala Asp Pro Met Asp  
 348 20 25 30  
 349 Ala Ile Ile Asn Thr Thr Cys Asn Tyr Gly Gln Val Ile Ala Ala Leu  
 350 35 40 45  
 351 Asn Ala Ser Asp Pro Ala Ala Ala Gln Gln Leu Asn Ser Ser Pro Met  
 352 50 55 60  
 353 Ala Gln Ser Tyr Ile Gln Arg Phe Leu Ala Ser Pro Pro Ala Lys Arg  
 354 65 70 75 80  
 355 Gln Gln Met Ala Gln Gln Ile Gln Gly Met Pro Ala Ala Gln Gln Tyr  
 356 85 90 95  
 357 Ile Asn Asp Ile Asn Gln Val Ala Val Thr Cys Asn Asn Phe  
 358 100 105 110  
 497 <210> SEQ ID NO: 8  
 498 <211> LENGTH: 454  
 499 <212> TYPE: PRT  
 500 <213> ORGANISM: Mycobacterium avium paratuberculosis  
 501 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:  
 502 immunogenic protein of M. avium paratuberculosis  
 504 <400> SEQUENCE: 8  
 505 Val Ala Pro Lys Val Ser Ser Asp Leu Phe Ser Gln Ile Val Asn Ser  
 506 1 5 10 15  
 507 Gly Pro Gly Ser Phe Leu Ala Lys Gln Leu Gly Val Pro Gln Pro Glu  
 508 20 25 30  
 509 Thr Leu Arg Arg Tyr Arg Pro Gly Asp Pro Pro Leu Ala Gly Ser Leu  
 510 35 40 45  
 511 Leu Ile Gly Gly Glu Gly Arg Val Val Glu Pro Leu Arg Ala Ala Leu  
 512 50 55 60  
 513 Ala Lys Asp Tyr Asp Leu Val Gly Asn Asn Leu Gly Gly Arg Trp Ala  
 514 65 70 75 80  
 515 Asp Arg Phe Gly Gly Leu Val Phe Asp Ala Thr Gly Ile Thr Thr Pro  
 516 85 90 95  
 517 Glu Gly Leu Lys Gly Leu Tyr Glu Phe Thr Pro Leu Leu Arg Asn  
 518 100 105 110  
 519 Leu Gly His Cys Ala Arg Val Val Val Val Gly Thr Thr Pro Asp Ala  
 520 115 120 125  
 521 Ala Ala Gly Pro His Glu Arg Ile Ala Gln Arg Ala Leu Glu Gly Phe

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

```

522      130      135      140
523 Thr Arg Ser Leu Gly Lys Glu Leu Arg Asn Gly Ser Thr Val Ala Leu
524 145      150      155      160
525 Val Tyr Leu Ser Pro Ala Ala Lys Pro Ala Ala Thr Gly Leu Glu Ser
526      165      170      175
527 Thr Met Arg Phe Ile Leu Ser Ala Lys Ser Ala Tyr Val Asp Gly Gln
528      180      185      190
529 Val Phe Tyr Val Gly Glu Ala Asp Ser Thr Pro Pro Ala Asp Trp Glu
530      195      200      205
531 Arg Pro Leu Asp Gly Lys Val Ala Ile Val Thr Gly Ala Ala Arg Gly
532      210      215      220
533 Ile Gly Ala Thr Ile Ala Glu Val Phe Ala Arg Asp Gly Ala Arg Val
534 225      230      235      240
535 Val Ala Ile Asp Val Glu Ser Ala Ala Glu Thr Leu Ala Glu Thr Ala
536      245      250      255
537 Ser Arg Val Gly Gly Thr Ala Leu Trp Leu Asp Val Thr Ala Pro Asp
538      260      265      270
539 Ala Val Asp Lys Ile Thr Glu His Leu Arg Glu His His Gly Gly His
540      275      280      285
541 Ala Asp Ile Leu Val Asn Asn Ala Gly Ile Thr Arg Asp Lys Leu Leu
542      290      295      300
543 Ala Asn Met Asp Asp Ala Arg Trp Asp Ala Val Leu Ala Val Asn Leu
544 305      310      315      320
545 Leu Ala Pro Leu Arg Leu Thr Glu Gly Leu Val Gly Asn Gly Ser Ile
546      325      330      335
547 Gly Glu Gly Gly Arg Ile Val Gly Leu Ser Ser Met Ala Gly Ile Ala
548      340      345      350
549 Gly Asn Arg Gly Gln Thr Asn Tyr Ala Thr Thr Lys Ala Gly Met Ile
550      355      360      365
551 Gly Leu Thr Gln Ala Leu Ala Pro Glu Leu Tyr Asp Lys Gly Ile Thr
552      370      375      380
553 Ile Asn Ala Val Ala Pro Gly Phe Ile Glu Thr Gln Met Thr Ala Ala
554 385      390      395      400
555 Ile Pro Leu Ala Thr Arg Glu Val Gly Arg Arg Met Asn Ser Leu Leu
556      405      410      415
557 Gln Gly Gly Gln Pro Val Asp Val Ala Glu Thr Ile Ala Tyr Phe Ala
558      420      425      430
559 Ser Pro Ala Ser Asn Ala Val Thr Gly Asn Val Ile Arg Val Cys Gly
560      435      440      445
561 Gln Ala Met Leu Gly Ala
562      450

```

630 &lt;210&gt; SEQ ID NO: 10

631 &lt;211&gt; LENGTH: 149

632 &lt;212&gt; TYPE: PRT

633 &lt;213&gt; ORGANISM: Mycobacterium avium paratuberculosis

634 &lt;223&gt; OTHER INFORMATION: Description of Combined DNA/RNA Molecule:

635 immunogenic protein of M. avium paratuberculosis

637 &lt;400&gt; SEQUENCE: 10

638 Met Leu Val Ala Thr Val Arg Ala Phe Ile Asp Arg Glu Val Lys Pro

OK

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

639 1 5 10 15  
641 Thr Val Arg Glu Val Glu His Ala Asp Ala Tyr Pro Glu Ala Trp Ile  
642 20 25 30  
644 Glu Gln Met Lys Arg Ile Gly Ile Tyr Gly Leu Ala Val Pro Glu Glu  
645 35 40 45  
647 Tyr Gly Gly Ser Pro Val Ser Met Pro Cys Tyr Val Arg Val Thr Glu  
648 50 55 60  
650 Gln Leu Ala Arg Gly Trp Met Ser Leu Ala Gly Ala Met Gly Gly His  
651 65 70 75 80  
W--> 653 Thr Val Val Ala Lys Leu Leu Thr Leu Phe Gly Thr Glu Asp Xaa Lys  
654 85 90 95  
656 Arg Ala Tyr Leu Pro Arg Met Ala Ser Gly Glu Ile Arg Ala Thr Met  
657 100 105 110  
659 Ala Leu Thr Glu Pro Xaa Gly Gly Ser Asp Leu Gln Asn Met Ser Thr  
660 115 120 125  
662 Thr Ala Leu Pro Asp Pro Asp Ser Asp Xaa Leu Val Val Asn Gly Ala  
663 130 135 140  
665 Lys Thr Xaa Ile Asn  
666 145  
701 <210> SEQ ID NO: 12  
702 <211> LENGTH: 31  
703 <212> TYPE: PRT  
704 <213> ORGANISM: Mycobacterium avium paratuberculosis  
705 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:  
706 immunogenic protein of M. avium paratuberculosis  
E--> 708 <400> SEQUENCE: 12  
709 Met Ser His Ala Asp Gln Leu Ala Arg Thr His Leu Ala Pro Asp Pro  
710 1 5 10 15  
712 Ala Asp Leu Ser Arg Leu Val Ala Gly Thr His His Asp Pro His  
713 20 25 30  
752 <210> SEQ ID NO: 14  
753 <211> LENGTH: 69  
754 <212> TYPE: PRT  
755 <213> ORGANISM: Mycobacterium avium paratuberculosis  
756 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:  
757 immunogenic protein of M. avium paratuberculosis  
E--> 759 <400> SEQUENCE: 14  
760 Asn Val Thr Gly Val Phe Leu Thr Ala Gln Ala Ala Arg Ala Met  
761 1 5 10 15  
763 Met Arg Gln Gly Arg Gly Gly Ala Ile Ile Thr Thr Ala Ser Met Ser  
764 20 25 30  
766 Gly His Ile Ile Asn Val Pro Gln Gln Val Gly His Tyr Cys Ala Ser  
767 35 40 45  
769 Lys Ala Ala Val Ile Gln Leu Thr Lys Ala Met Ala Val Glu Phe Cys  
770 50 55 60  
772 Arg Ile Arg Arg Leu  
773 65  
831 <210> SEQ ID NO: 16  
832 <211> LENGTH: 131

p/s explain  
"Xaa"  
locations.  
p/s see error explanation on page 11.

same error

same error





## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

OK

```

1127 <400> SEQUENCE: 20
1128 Met Ala Arg Ala Val Gly Ile Asp Leu Gly Thr Thr Asn Ser Val Val
1129 1 5 10 15
1130 Ala Val Leu Glu Gly Gly Asp Pro Val Val Val Ala Asn Ser Glu Gly
1131 20 25 30
1132 Ser Arg Thr Thr Pro Ser Ile Val Ala Phe Ala Arg Asn Gly Glu Val
1133 35 40 45
1134 Leu Val Gly Gln Pro Ala Lys Asn Gln Ala Val Thr Asn Val Asp Arg
1135 50 55 60
1136 Thr Ile Arg Ser Val Lys Arg His Met Gly Thr Asp Trp Ser Ile Glu
1137 65 70 75 80
1138 Ile Asp Gly Lys Lys Tyr Thr Ala Gln Glu Ile Ser Ala Arg Val Leu
1139 85 90 95
1140 Met Lys Leu Lys Arg Asp Ala Glu Ala Tyr Leu Gly Glu Asp Ile Thr
1141 100 105 110
1142 Asp Ala Val Ile Thr Val Pro Ala Tyr Phe Asn Asp Ala Gln Arg Gln
1143 115 120 125
1144 Ala Thr Lys Glu Ala Gly Gln Ile Ala Gly Leu Asn Val Leu Arg Ile
1145 130 135 140
1146 Val Asn Glu Pro Thr Ala Ala Ala Leu Ala Tyr Gly Leu Asp Lys Gly
1147 145 150 155 160
1148 Glu Lys Glu Gln Thr Ile Leu Val Phe Asp Leu Gly Gly Gly Thr Phe
1149 165 170 175
1150 Asp Val Ser Leu Leu Glu Ile Gly Glu Gly Val Val Glu Val Arg Ala
1151 180 185 190
1152 Thr Ser Gly Asp Asn Gln Leu Gly Gly Asp Asp Trp Asp Asp Arg Ile
1153 195 200 205
1154 Val Asn Trp Leu Val Asp Lys Phe Lys Gly Thr Ser Gly Ile Asp Leu
1155 210 215 220
1156 Thr Lys Asp Lys Met Ala Met Gln Arg Leu Arg Glu Ala Ala Glu Lys
1157 225 230 235 240
1158 Ala Lys Ile Glu Leu Ser Ser Ser Gln Ser Thr Ser Ile Asn Leu Pro
1159 245 250 255
1160 Tyr Ile Thr Val Asp Ala Asp Lys Asn Pro Leu Phe Leu Asp Glu Gln
1161 260 265 270
1162 Leu Thr Arg Ala Glu Phe Gln Arg Ile Thr Gln Asp Leu Leu Asp Arg
1163 275 280 285
1164 Thr Arg Gln Pro Phe Lys Ser Val Ile Ala Asp Ala Gly Ile Ser Val
1165 290 295 300
1166 Ser Asp Ile Asp His Val Val Leu Val Gly Gly Ser Thr Arg Met Pro
1167 305 310 315 320
1168 Ala Val Thr Asp Leu Val Lys Glu Leu Thr Gly Gly Lys Glu Pro Asn
1169 325 330 335
1170 Lys Gly Val Asn Pro Asp Glu Val Val Ala Val Gly Ala Ala Leu Gln
1171 340 345 350
1172 Ala Gly Val Leu Lys Gly Glu Val Lys Asp Val Leu Leu Asp Val
1173 355 360 365
1174 Thr Pro Leu Ser Leu Gly Ile Glu Thr Lys Gly Gly Val Met Thr Lys
1175 370 375 380

```

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

```

1176 Leu Ile Glu Arg Asn Thr Thr Ile Pro Thr Lys Arg Ser Glu Thr Phe
1177 385                               390                               395                               400
1178 Thr Thr Ala Asp Asp Asn Gln Pro Ser Val Gln Ile Gln Val Tyr Gln
1179                               405                               410                               415
1180 Gly Glu Arg Glu Ile Ala Ala His Asn Lys Leu Leu Gly Ser Phe Glu
1181                               420                               425                               430
1182 Leu Thr Gly Ile Pro Pro Ala Pro Arg Gly Val Pro Gln Ile Glu Val
1183                               435                               440                               445
1184 Thr Phe Asp Ile Asp Ala Asn Gly Ile Val His Val Thr Ala Lys Asp
1185                               450                               455                               460
1186 Lys Gly Thr Gly Lys Glu Asn Thr Ile Lys Ile Gln Glu Gly Ser Gly
1187 465                               470                               475                               480
1188 Leu Ser Lys Glu Glu Ile Asp Arg Met Ile Lys Asp Ala Glu Ala His
1189                               485                               490                               495
1190 Ala Glu Glu Asp Arg Lys Arg Arg Glu Glu Ala Asp Val Arg Asn Gln
1191                               500                               505                               510
1192 Ala Glu Ser Leu Val Tyr Gln Thr Glu Lys Phe Val Lys Asp Gln Arg
1193                               515                               520                               525
1194 Glu Ala Glu Gly Gly Ser Lys Val Pro Glu Glu Thr Leu Ser Lys Val
1195                               530                               535                               540
1196 Asp Ala Ala Ile Ala Asp Ala Lys Thr Ala Leu Gly Gly Thr Asp Ile
1197 545                               550                               555                               560
1198 Thr Ala Ile Lys Ser Ala Met Glu Lys Leu Gly Gln Glu Ser Gln Ala
1199                               565                               570                               575
1200 Leu Gly Gln Ala Ile Tyr Glu Ala Thr Gln Ala Glu Ser Ala Gln Ala
1201                               580                               585                               590
1202 Gly Gly Pro Asp Gly Ala Ala Ala Gly Gly Gly Ser Gly Ser Ala Asp
1203                               595                               600                               605
1204 Asp Val Val Asp Ala Glu Val Val Asp Asp Asp Arg Glu Ser Lys
1205                               610                               615                               620
1365 <210> SEQ ID NO: 22
1366 <211> LENGTH: 541
1367 <212> TYPE: PRT
1368 <213> ORGANISM: Mycobacterium avium paratuberculosis
1369 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule:
1370 immunogenic protein of M. avium paratuberculosis
1371
1372 <400> SEQUENCE: 22
1373 Met Ala Lys Thr Ile Ala Tyr Asp Glu Glu Ala Arg Arg Gly Leu Glu
1374 1                               5                               10                               15
1375 Arg Gly Leu Asn Ala Leu Ala Asp Ala Val Lys Val Thr Leu Gly Pro
1376                               20                               25                               30
1377 Lys Gly Arg Asn Val Val Leu Glu Lys Lys Trp Gly Ala Pro Thr Ile
1378                               35                               40                               45
1379 Thr Asn Asp Gly Val Ser Ile Ala Lys Glu Ile Glu Leu Glu Asp Pro
1380                               50                               55                               60
1381 Tyr Glu Lys Ile Gly Ala Glu Leu Val Lys Glu Val Ala Lys Lys Thr
1382 65                               70                               75                               80
1383 Asp Asp Val Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala Gln
1384                               85                               90                               95

```

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

```

1385 Ala Leu Val Arg Glu Gly Leu Arg Asn Val Ala Ala Gly Ala Asn Pro
1386          100          105          110
1387 Leu Gly Leu Lys Arg Gly Ile Glu Lys Ala Val Glu Lys Val Thr Glu
1388          115          120          125
1389 Thr Leu Leu Lys Ser Ala Lys Glu Val Glu Thr Lys Asp Gln Ile Ala
1390          130          135          140
1391 Ala Thr Ala Ala Ile Ser Ala Gly Asp Gln Ser Ile Gly Asp Leu Ile
1392 145          150          155          160
1393 Ala Glu Ala Met Asp Lys Val Gly Asn Glu Gly Val Ile Thr Val Glu
1394          165          170          175
1395 Glu Ser Asn Thr Phe Gly Leu Gln Leu Glu Leu Thr Glu Gly Met Arg
1396          180          185          190
1397 Phe Asp Lys Gly Tyr Ile Ser Gly Tyr Phe Val Thr Asp Ala Glu Arg
1398          195          200          205
1399 Gln Glu Ala Val Leu Glu Asp Pro Phe Ile Leu Leu Val Ser Ser Lys
1400          210          215          220
1401 Val Ser Thr Val Lys Asp Leu Leu Pro Leu Leu Glu Lys Val Ile Gln
1402 225          230          235          240
1403 Ala Gly Lys Pro Leu Leu Ile Ile Ala Glu Asp Val Glu Gly Glu Ala
1404          245          250          255
1405 Leu Ser Thr Leu Val Val Asn Lys Ile Arg Gly Thr Phe Lys Ser Val
1406          260          265          270
1407 Ala Val Lys Ala Pro Gly Phe Gly Asp Arg Arg Lys Ala Met Leu Gln
1408          275          280          285
1409 Asp Met Ala Ile Leu Thr Gly Gly Gln Val Ile Ser Glu Glu Val Gly
1410          290          295          300
1411 Leu Ser Leu Glu Ser Ala Asp Ile Ser Leu Leu Gly Lys Ala Arg Lys
1412 305          310          315          320
1413 Val Val Val Thr Lys Asp Glu Thr Thr Ile Val Glu Gly Ala Gly Asp
1414          325          330          335
1415 Ser Asp Ala Ile Ala Gly Arg Val Ala Gln Ile Arg Thr Glu Ile Glu
1416          340          345          350
1417 Asn Ser Asp Ser Asp Tyr Asp Arg Glu Lys Leu Gln Glu Arg Leu Ala
1418          355          360          365
1419 Lys Leu Ala Gly Gly Val Ala Val Ile Lys Ala Gly Ala Ala Thr Glu
1420          370          375          380
1421 Val Glu Leu Lys Glu Arg Lys His Arg Ile Glu Asp Ala Val Arg Asn
1422 385          390          395          400
1423 Ala Lys Ala Ala Val Glu Glu Gly Ile Val Ala Gly Gly Gly Val Ala
1424          405          410          415
1425 Leu Leu His Ala Ile Pro Ala Leu Asp Glu Leu Lys Leu Glu Gly Glu
1426          420          425          430
1427 Glu Ala Thr Gly Ala Asn Ile Val Arg Val Ala Leu Glu Ala Pro Leu
1428          435          440          445
1429 Lys Gln Ile Ala Phe Asn Gly Gly Leu Glu Pro Gly Val Val Ala Glu
1430          450          455          460
1431 Lys Val Arg Asn Ser Pro Ala Gly Thr Gly Leu Asn Ala Ala Thr Gly
1432 465          470          475          480
1433 Glu Tyr Glu Asp Leu Leu Lys Ala Gly Ile Ala Asp Pro Val Lys Val

```

## RAW SEQUENCE LISTING

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:51

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

1434				485					490				495			
1435	Thr	Arg	Ser	Ala	Leu	Gln	Asn	Ala	Ala	Ser	Ile	Ala	Gly	Leu	Phe	Leu
1436				500					505					510		
1437	Thr	Thr	Glu	Ala	Val	Val	Ala	Asp	Lys	Pro	Glu	Lys	Ala	Ala	Ala	Pro
1438				515					520					525		
1439	Ala	Gly	Asp	Pro	Thr	Gly	Gly	Met	Gly	Gly	Met	Asp	Phe			
1440				530					535					540		

## VARIABLE LOCATION SUMMARY

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:52

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

Use of n's or Xaa's (NEW RULES):

Use of n's and/or Xaa's have been detected in the Sequence Listing.

Use of <220> to <223> is MANDATORY if n's or Xaa's are present.in <220> to <223> section, please explain location of n or Xaa, and which  
residue n or Xaa represents.

Seq#:9; N Pos. 592,619 ✓

Seq#:9; Xaa Pos. 95,118,138,147

Seq#:10; Xaa Pos. 95,118,138,147 ✓

Seq#:15; N Pos. 331,398

Seq#:15; Xaa Pos. 103,125

Seq#:16; Xaa Pos. 103,125

Seq#:17; Xaa Pos. 88,99

Seq#:18; Xaa Pos. 88,99

**ERROR EXPLANATION: 2**

## VERIFICATION SUMMARY

DATE: 09/24/2004

PATENT APPLICATION: US/10/501,127

TIME: 16:55:52

Input Set : A:\2002.032 US Sequence Listing.txt

Output Set: N:\CRF4\09242004\J501127.raw

L:14 M:270 C: Current Application Number differs, Replaced Current Application Number  
L:15 M:271 C: Current Filing Date differs, Replaced Current Filing Date  
L:138 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:2 ✓  
L:254 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:4 ✓  
L:344 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:6 ✓  
L:494 M:336 W: Invalid Amino Acid Number in Coding Region, SEQ ID:7 ✓  
L:504 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:8 ✓  
L:610 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:9 after pos.:466  
M:341 Repeated in SeqNo=9  
L:637 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:10 ✓  
L:653 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:10 ✓  
L:653 M:258 W: Mandatory Feature missing, <221> Tag not found for SEQ ID#:10 ✓  
L:653 M:258 W: Mandatory Feature missing, <222> Tag not found for SEQ ID#:10 ✓  
L:653 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:10 after pos.:80  
M:341 Repeated in SeqNo=10  
L:708 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:12 ✓  
L:759 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:14 ✓  
L:818 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:15 after pos.:291  
M:341 Repeated in SeqNo=15  
L:838 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:16 ✓  
L:857 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:16  
L:857 M:258 W: Mandatory Feature missing, <221> Tag not found for SEQ ID#:16  
L:857 M:258 W: Mandatory Feature missing, <222> Tag not found for SEQ ID#:16  
L:857 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:16 after pos.:96  
M:341 Repeated in SeqNo=16  
L:911 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:17 after pos.:392  
L:922 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:18 ✓  
L:938 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:18  
L:938 M:258 W: Mandatory Feature missing, <221> Tag not found for SEQ ID#:18  
L:938 M:258 W: Mandatory Feature missing, <222> Tag not found for SEQ ID#:18  
L:938 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:18 after pos.:80  
M:341 Repeated in SeqNo=18  
L:1127 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:20 ✓  
L:1372 M:200 E: Mandatory Header Field missing, <220> Tag not found for SEQ ID#:22 ✓

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**